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ABSTRACT

In 1981-82 a questionnaire was sent to member countries of UNESCO by the International Environmental Education Programme (IEEP) to determine current needs, priorities, and major trends in environmental education. Of particular interest to the IEEP were developments since the 1977 Intergovernmental Conference on Environmental Education held in Tbilisi, Russia. This document contains the preliminary analysis of results of the questionnaire, along with information collected through other recent publications and documents. Part 1, which is devoted to world trends, needs and priorities, is divided into three chapters. These chapters focus on: (1) descriptions of action undertaken by UNESCO with a view to developing environmental education since the Tbilisi conference; (2) discussions of progress and trends in the development of environmental education throughout the world today, on the basis of national experiences and guidelines; and (3) identification of the most pressing needs to be fulfilled concerning environmental education and member state's priorities for action in this respect. Part 2 consists of two chapters which focus on regional particularities in the discussion of the problems of environmental education. (TW)

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Unesco-UNEP International Environmental Education Programme

Environmental Education Series **1**

Trends, needs and priorities of environmental education since the Tbilisi Conference: an overview

(Preliminary report of a world survey)

Division of Science, Technical and Vocational Education

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INTRODUCTION

1. When the International Environmental Education Programme (IEEP) was launched by Unesco in 1975 in co-operation with UNEP, it undertook a worldwide survey on the environmental education needs and priorities of Member States in order to provide guidelines for this new field of activity. Seven years after its foundation, IEEP considered it advisable to carry out a second survey with a view to determining present needs and priorities of Member States in relation to environmental education and the main trends in its development during the intervening period, and particularly since the Tbilisi conference (1977).

2. This overview is based on a preliminary analysis of information collected through recent publications, documents and other material regarding environmental education, particularly on a questionnaire sent to member countries of Unesco by IEEP in 1981/1982. Of the present Member States, eighty-one, representing a broad spectrum of the regions of the world, replied to this questionnaire (48 per cent of African Member States, 55 per cent of those of Latin America, 41 per cent of those of Asia, 50 per cent of Arab states and 62 per cent of those of Europe and North America).

3. Methodologically, the questionnaire was designed to provide an overall picture of the situation regarding environmental education at the national level with each Member State, based on information and opinions provided by an officially designated team of specialists and administrators dealing with this matter. In this connection it is as well to note that about two-thirds of the national teams formed to provide replies to the questionnaire included at least three persons from various fields of education and the environmental sciences. In the vast majority of cases, these teams were co-ordinated by officials of the Ministry of Education (75 per cent) or of public institutions responsible for environmental policy (20 per cent).

4. The information presented here does not represent a full and detailed account of achievements of Member States in the field of environmental education. It shows what are the main trends in environmental education at world level since the Tbilisi conference and what hindrances there are to its development. However, this overview could be particularly useful in that it provides national officials in charge of environmental education with a sum of experiences and a frame of reference allowing them to perceive more clearly results obtained as well as the importance of efforts that should be devoted to the future development of this type of education.

5. The overview comprises two parts. Part One, which is devoted to trends, needs and priorities in environmental education at world level, is divided into three chapters: the first describes action undertaken by Unesco with a view to developing environmental education since the Tbilisi conference; the second deals with progress and trends in the development of environmental education throughout the world today, on the basis of national experiences and guidelines; the third identifies the most pressing needs to be fulfilled concerning environmental education and Member States' priorities for action in this respect. Part Two, which consists of two chapters (IV and V), focuses on regional particularities in the discussion of the above problems.

PART ONE

TRENDS, NEEDS AND PRIORITIES IN ENVIRONMENTAL EDUCATION AT WORLD LEVEL

CHAPTER I: UNESCO'S INTERNATIONAL ACTION IN THE SPHERE OF ENVIRONMENTAL EDUCATION

'It is recommended that the Secretary-General, the organizations of the United Nations system, especially Unesco, and the other international agencies concerned, should, after consultation and agreement, take the necessary steps to establish an international programme in environmental education, interdisciplinary in approach, in-school and out-of-school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen . . . with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment.'

(Recommendation 96, United Nations Conference on the Human Environment, Stockholm, 1972)

6. In 1975 Unesco, with the co-operation of the United Nations Environment Programme (UNEP), launched the International Environmental Education Programme (IEEP). Later, the Intergovernmental Conference on Environmental Education, a conference held at ministerial level (Tbilisi, Union of Soviet Socialist Republics, October 1977), considering that there was a great need for international co-operation in respect of the environmental education, which was keenly felt in all countries, especially developing countries, recommended that the Director-General of Unesco, in co-operation with UNEP, should continue his efforts to extend international co-operation in developing environmental education (Recommendations 22 to 27).

7. As a result of the Declaration and recommendations made at the Tbilisi conference, it was possible to define the nature and objectives of environmental education and the pedagogical principles on which it should be based, and also to determine what strategies should be adopted in its development at national and international level. The Tbilisi conference expressed the opinion that the environment should be thought of as a whole including both the natural aspects and those which were the result of human action; it regarded environmental education as a dimension of education, interdisciplinary in approach, directed towards problem-solving and concerned with local realities, and which needed to be integrated into all forms of the educational process, general and specialized, in-school and out-of-school. According to the Tbilisi conference, the target populations for environmental education were:

(1) the general public, or non-specialists;

(2) groups whose professional activities have a significant impact on the environment;

(3) scientists and technicians in the field of the environment who should be given specialized training.

8. As far as the general public is concerned, Unesco's action has been taken by means of IEEP. The results attributable to the action of IEEP over the last five years can be best apprehended in three complementary domains: its contribution to the development of awareness amongst the general public of the need for environmental education; its contribution to the development of concepts and

methodological approaches in this sphere, and its contribution to efforts to incorporate an environmental dimension into the educational processes of Member States.(1)

9. One of the IEEP actions which contributed the most to the development of international awareness concerning environmental education is the series of international and regional meetings which led to the intergovernmental conference at Tbilisi. In this respect, the international workshop held in Belgrade (1975) was particularly important, as its recommendations and guidelines provided a preparatory frame of reference. At the regional meetings of experts which followed in Africa, the Arab states, Asia, Europe and North America and Latin America, the Belgrade recommendations were examined in the light of the needs and priorities of each of the different regions, and this helped in the preparations for the Tbilisi conference, which was the culminating point of the series.

10. A policy of regularly supplying information has also done much to arouse international awareness concerning environmental education--for instance, the IEEP international newsletter Connect, which is published in five languages (Arabic, English, French, Russian and Spanish) and has on its mailing list about 12,000 individuals or institutions throughout the world actively involved in the promotion and development of environmental education and training.

11. Another important aspect of the development of environmental education at international, regional and national level concerns the clarification of concepts and methodology in this sphere. Since 1977, and as a follow-up to the conclusions of the Tbilisi conference, a vast effort has been made, on the national and international level, to identify more accurately the content and themes to be covered in environmental education, as well as methods which would lead to its success. IEEP has done much to achieve this, in particular by organizing classes, seminars, research and action projects in every region, as a result of which it has been made clear that environmental education should be a dimension of every subject taught and should be concerned with all aspects of the human environment--social, natural, economic and so on. Another important point is the emphasis laid on the interdisciplinary approach of environmental education, which is necessary if it is to contribute effectively to the solution of environmental problems, and also on the need for it to reach all sectors of the population by means of in-school and out-of-school education.

12. Besides making a general contribution to awareness about environmental education and to the clarification of its concepts and methodology, IEEP has associated itself with attempts to integrate the environmental dimension into the educational practice of Member States. For instance, inter-institutional committees were formed by countries in every region, after regional conferences had been held, and national training courses or pilot projects were undertaken or supported by IEEP, in order to further the integration of environmental education into educational systems, both in and out of school.

13. The contribution of the programme towards the incorporation of environmental education has borne more specifically on two aspects of education--firstly the development of content, methods and teaching materials and secondly, teacher training.

(1) For detailed information on specific activities of IEEP, see the information document: Activities of the Unesco-UNEP International Environmental Education Programme, 1975-1982.

14. As far as teacher training is concerned, the programme has organized, since 1976, and especially since 1978, a series of regional and subregional seminars aimed at making those in charge of the administration of education, the development of curricula and teaching more aware of their responsibilities in the matter. These seminars have dealt with questions concerning the adoption of national policies for environmental education, the development of systems of pre-service and in-service training of educators, and the formulation of guidelines for the preparation of educational materials. The programme has also organized national teacher-training courses and pilot projects, or has assisted in their organization.

15. As far as the development of content, methods and materials for environmental education is concerned, IEEP has carried out a number of research activities on methods and contents, which have produced a coherent body of teaching material, including methodological guides and textbooks, and a series of modules for use in the training and retraining of teachers as well as in the practice of environmental education at primary and secondary level. In addition to this basic material, surveys and guides have been prepared that deal with problems of methodology which are particularly suited to environmental education, such as: the use of the modular and simulation approaches, and means and methods for evaluating environmental education. Moreover, a glossary in several languages has been prepared so as to standardize the environmental education terminology in use at present in the different countries. Finally, the various pilot projects have succeeded not only in making decision-makers more aware of the need for environmental education, but also in training groups of educators at national level and in making it possible to prepare teaching material suited to local conditions.

16. Apart from the role played by IEEP in the development of environmental education at national level, it has also had a multiplying effect at international level. From its inception, IEEP believed it should collaborate with the United Nations agencies, as well as with other intergovernmental and non-governmental bodies, in the field of environmental education. Formal and informal meetings have been held for this purpose. Today, a growing number of international and regional organizations incorporate environmental education into their programmes.

17. As far as the training of environmental specialists is concerned, Unesco's action has been taken mainly--though not exclusively--by means of the 'Man and the Biosphere programme' (MAB), the Human Settlement Managers' Training Programme and the International Programme on Environmental Education and Training of Engineers (IPEETE). From its inception, the MAB programme, launched one year before the Stockholm conference, treated the training of specialized personnel as the key to the planning and implementation of ecological research programmes. The Human Settlement Managers' Training Programme, created in the mid-1970s by Unesco and UNEP, is intended to provide administrators in the public sector, particularly in the developing countries, with education and training in the planning and integrated management of human establishments. Although Unesco organized environmental training programmes for engineers before the Stockholm conference, IPEETE itself was set up by Unesco and UNEP at the beginning of 1977, and has since concentrated on the dissemination of information with a view to strengthening the environmental aspect of the training of engineers.

18. In conclusion, it can be said that Unesco has contributed to the promotion of the development of environmental education at the national and international level. However, the organizational and pedagogical changes required for the widespread incorporation of an environmental dimension into school and out-of-school education in Member States are of such magnitude that one must accept the fact that the situation will evolve gradually, and that efforts made to date must be continued.

CHAPTER II: PROGRESS AND TRENDS IN ENVIRONMENTAL EDUCATION AT WORLD LEVEL, AS A RESULT OF NATIONAL EXPERIENCE

The development of awareness concerning the environment

'Environmental education must . . . create an awareness of the economic, political and ecological interdependence of the modern world so as to enhance a spirit of responsibility and solidarity among nations. This is a prerequisite for resolving serious environmental problems at the global level.'

(Final report of the Tbilisi conference)

19. Over the past few decades, the gravity of environmental problems has grown so rapidly that political and administrative action has often proved to be insufficient to tackle them effectively. At the beginning of the 1970s, when the scientific community drew attention to the complexity and urgency of some of these problems, environmental awareness increased considerably. Conservation and improvement of the quality of the environment were seen more clearly as a problem which should be approached with consideration of its various aspects and dimensions, both scientific and ethical, and which required the participation of all sectors of the population, in addition to administrative action and specialized technical actions.

20. Today there is a better understanding of the fact that environmental problems (various forms of pollution, the misuse of natural resources, the deterioration of soils, the ill-controlled dynamics of some of the systems created by man, etc.) are mainly the outcome of man's activity, whether as producer or as consumer. It is also better understood that, if truly harmonious relations are to be developed between people and their environment, certain values and individual forms of behaviour must be changed, and certain economic and technological orientations which could have an adverse effect on the quality of the environment and the conservation of its productive potential should be reviewed.

21. This has also made people more conscious of the worldwide implications of environmental problems, not only because of certain specific problems which go beyond national frontiers but also because of the irrational use of natural resources and of the productive potential of the environment, as a consequence of the imbalance of economic development at international level. Thus there is increasing awareness of the fact that an improvement in the quality of the environment at world level goes hand in hand with the establishment of a new economic order, more just and more equitable.

22. Various factors, at national and international level, have helped to develop awareness concerning the environment. Most Member States agree that the mass media (television, radio and press) do more than anything else to make people aware of environmental problems. Most countries also consider that the scientific community and public authorities, through their decisions and their actions, have exerted a marked influence on the development of awareness concerning the environment and its problems. Political will has made itself felt mainly through the adoption or reinforcement of legislation concerning the environment and through the incorporation of an environmental dimension into the educational process. Finally, voluntary associations (consumers' and users' associations, those for nature conservation groups, and others) have done much, especially in industrialized countries, to arouse public opinion and to initiate people into practical ways of solving environmental problems.

23. It is certainly true that, at the international level, concern for the environment and its problems has increased over the past few years, but not uniformly within countries. To begin with, it would appear that the importance of the environment as a dimension in daily life is recognized by city-dwellers rather than by those who live in small towns or in the country. This is probably because city-dwellers are faced with environmental problems whose effects they perceive directly and daily (atmospheric pollution, noise, urban overcrowding, etc.) and also because they have better access to information about the environment, since cities have a greater density of mass media.

24. Moreover, independently of the type of habitat, awareness concerning the environment has not developed to the same extent in the various sectors of the population. Generally, persons in occupational categories whose work is predominantly intellectual (teachers, students and pupils) and officials in the public administration have proved to be more aware of the problem. In the other occupational categories, in particular in the industrial and agricultural sectors (workers, peasants, businessmen) the increase in awareness has been less notable.

25. It would appear that awareness of the environment is still dependent on its social basis: it is more developed in the intellectual sectors of the population and less so in the productive sectors. In some countries, these sectors occasionally seem to be concerned about the environment for more practical reasons: some are worried about the increase in production costs which investment in suitable environmental technology might entail, others about job security, which might be affected in the short range by the termination of investments in projects considered incompatible with protection of the environment, or by the development of new technologies which necessitate elaborate manpower retraining or increased occupational and spatial mobility.

26. This situation has important implications for environmental policies, because the efficiency of the latter seems to depend upon increased awareness on the part of those who, through the decisions they take every day on economic and technological matters, often have a significant influence on the quality of the human environment. Therefore the occupational categories in the productive sector ought to be one of the priority targets of the awareness and information policies to be undertaken by Member States.

Policies, planning and mechanisms for the development of environmental education

'The determination of bases for a strategy, at all educational and governmental levels, constitutes the first stage needed for the introduction of environmental education into education in general . . . This task requires the . . . establishment of a new relationship between all those engaged together in the education process. To this end, legislative measures may be taken providing the state with a legal framework in which to draw up an environmental education system for the entire community.'

(Final report, Tbilisi conference)

27. The establishment of legislation under which environmental policies of a general nature can be formulated and which sets up institutionalized mechanisms specialized in this domain probably originated in the United Nations Conference on the Human Environment (Stockholm, 1972). This 'second-generation' legislation, which, towards the end of the 1970s, characterized the approach to environmental problems in most industrialized countries and in a number of developing countries, made it possible to co-ordinate more effectively the action of the various public administrative bodies concerned with the environment and to encourage societies to

take action of various kinds in order to solve the most acute problems of environmental deterioration (for example, the various types of pollution and environmental nuisance, the use of natural resources, in particular water and energy resources).

28. Thanks to this legislation, it has been possible to determine more or less accurately what the priorities are and what steps should be taken to provide training for high-level specialists who are required for the implementation of the technical aspects of environmental policies. Nevertheless, in so far as public information and particularly general education are concerned, legislation has remained too general to guide systematic educational action concerning the environment.

29. The implementation of national policies and programmes aiming at the incorporation of an environmental dimension into the various levels and types of general and specialized education is a relatively recent step; in most countries it appears to be the outcome of the Tbilisi conference and of the increased awareness which it provoked regarding the environment. Since this conference, very many countries have accepted the fact that action to protect the environment concerns all sectors of the community and that if the underlying causes of environmental problems are to be tackled, the knowledge, values, attitudes and behaviour of the people with regard to the environment will have to be considerably changed. Systematic environmental education has now been introduced in most industrialized countries and in a considerable number of developing countries in the various regions. However, the legal bases of such education and its organizational system at national level vary considerably.

30. In most cases these environmental education activities have been inscribed in the framework of existing regulations in the different administrative sectors--education, health, agriculture, etc.--which have been adapted to include environmental education. In such cases the country's educational action takes the form of a number of separate measures which, although intended for different groups of the population (school population, farmers, industrial workers) according to the administrative sectors in question, do not always constitute coherent national policies. Nevertheless, these attempts bear witness to the national political will for environmental education and are likely to lead to forms of action that are better co-ordinated and therefore more efficient, as to both conception and implementation.

31. In some countries, what can really be called environmental education policies have been formulated on the basis of decrees for the application of environmental laws. They have resulted in the creation of specialized bodies which have in some cases enabled national efforts in this sphere to be more effectively co-ordinated.

32. The forms adopted by these bodies vary from one country to another; this depends mainly upon the institutional level at which they are established in their spheres of competence, and also upon the formal character of their directives. It is, however, possible to classify them in four main types. Intersectoral commissions are frequently found; they are usually presided over by a ministry of the same rank as that of the other participating administrations (generally the ministry for education or for the environment). These commissions are primarily bodies providing for the exchange of information concerning the policies drawn up by the various administrative sectors, although, in certain cases, the commissions may also formulate general recommendations in the sphere of their competence.

33. Interministerial commissions are also found, though less frequently; their task is to prepare policies whose application is compulsory for participating sectors, although these policies are often implemented independently by the sectors concerned (as in the USSR, for example).

34. In some cases, ministries for the environment perform certain educational functions (in-school and out-of-school) without, however, duplicating similar activities undertaken by other ministries. A commission for intersectoral co-ordination is often attached to them (as in Brazil and Venezuela, for example).

35. Finally, in some countries there are national agencies for the environment whose function is to work out an integral environmental policy (including education), to prepare the national environment budget, to see to the financing of the operational services in each sector and to supervise the application of the policy (e.g. the United States of America and the Ukrainian Soviet Socialist Republic).

36. The real efficiency of these various bodies depends largely on the national political and administrative systems and on their financial, administrative and technical powers. But it must be recognized that these bodies promote the implementation of concerted environmental education policies, and represent an advance in the rationalization of efforts and resources set aside for such education.

37. Lastly, two other characteristics of present trends in national policies in environmental education since the Tbilisi conference should be mentioned: first, the environmental problems to which Member States have given priority and, second, the population groups for which their educational action is intended. As far as the first point is concerned, countries have usually concentrated their action on the classical problems of environmental protection (the campaign against the pollution of water and air, the conservation of natural resources--forests, water, soils, non-renewable energy resources, etc.). In addition to these general problems, developing countries have always been concerned with problems of improving the people's conditions of health and nutrition, whereas industrialized countries have paid more attention to campaigns against the harmful effects of industrial urban life (noise, traffic accidents, urban congestion, deterioration of the landscape) and against certain social ills (alcoholism, smoking, etc.).

38. As for the population groups at which environmental education policies are directed, numerous countries in all regions report that they have lifelong education programmes for certain occupational groups, particularly in the agricultural sector (e.g. in Colombia, Cape Verde, Malawi, Upper Volta, India, Egypt, etc.) and in the industrial sector (as in many European countries). National campaigns for the protection of the environment and activities aimed at alerting and informing the general public by means of the mass media have also been developed on a large scale in most countries. However, despite the diversity and the multiplicity of the activities undertaken by Member States in the sphere of out-of-school education since the Tbilisi conference the bulk of the effort appears to have been directed towards the incorporation of an environmental dimension into school education. The industrialized countries have tended to favour secondary and higher education in this regard, while the developing countries have paid more attention to primary education, as well as to the training of high-level technicians and administrators, probably because of their relatively greater need of highly qualified personnel to implement environmental management policies.

Content, methods and materials for environmental education

'Environmental education should not be just one more subject to add to existing programmes, but should be incorporated into programmes intended for all learners, whatever their age . . . Its subject-matter should permeate every part of formal and non-formal programmes and constitute one and the same continuous, organic process . . . The central idea is to attain, by means of growing interdisciplinarity and of prior co-ordination of disciplines, a practical education oriented towards a solution of the problems of the environment, or at least to make pupils better equipped . . . to participate in decision-making.'

(Final report, Tbilisi conference)

39. During the past few years, the great majority of industrialized and developing countries have succeeded--national priorities and the financial and technical resources available being taken into account--in including environmental education programmes within the educational process, both in and out of school.

Environmental education in the formal educational process

40. In strategies for the incorporation of the environmental dimension into the formal educational process, the dominant trend has been to 'infuse' content relative to various environmental problems into the natural sciences (biology, ecology, etc.). However, appreciable progress has been made to break down the barriers between environmental education activities in these sciences. Many countries indicate that environmental content has also been incorporated into social studies such as geography, economics and philosophy. This provides evidence of considerable progress towards the holistic approach to environmental education: as well as possessing a good knowledge of the working of the natural ecosystems and the visible manifestation of environmental problems, it is essential to understand the underlying causes (social, economic and cultural) of deterioration in the human environment. Nevertheless, with regard to the content of environmental education programmes too much emphasis is still placed on theoretical cognitive aspects; affective questions (values, attitudes) and techniques are still given very little attention, sometimes almost none, in current environmental education.

41. The Tbilisi conference recognized the importance of an interdisciplinary approach as the best way to deal with the complexity of environmental problems throughout the educational process and to provide a basis for effective action designed to solve them. Such interdisciplinarity, however, is still difficult to achieve in most countries. The first obstacle lies in the institutional strategy of today's scientific practice. Research is generally conducted in a number of specialized disciplines which are still not sufficiently interrelated, and it is therefore unlikely at present that a given reality will be approached in an integrated manner, when scientific knowledge itself is being generated. At the level of the transmission of knowledge moreover, various difficulties are met with in the development of educational procedures based on the interdisciplinary approach to problems--teaching by teams of teachers belonging to different disciplines, for instance. Apart from the fact that teachers are insufficiently aware of the importance of interdisciplinary work, suitable educational materials or resources are lacking, there are institutional difficulties connected with the organization of school timetables or, again, arguments between teachers about their respective fields of competence. True, various countries have undertaken interdisciplinary educational activities concerning the environment at the various levels of school and out-of-school education, often when some practical undertaking was being carried out, but most such activities are small-scale experiments which have little influence on the educational process as a whole.

42. The development of interdisciplinary approaches necessitates redirecting the whole educational process, simultaneously involving the treatment of educational content, methods, the institutional organization of education and teacher training. Inevitably, such profound changes take place very slowly, keeping pace with educational reforms. In the meantime, it seems one must be satisfied with more modest solutions, such as to put more effort into the 'strategy of infusion', or develop general courses dealing with the environment. Some Member States have already adopted such strategies on quite a large scale, mainly for secondary and higher education.

43. Since the Tbilisi conference, environmental education has been considered essentially as education for discovery and action. This implies a teaching methodology that gives equal importance to the analytical and theoretical approach of the traditional scientific method as well as to the more synthetic and pragmatic problem-solving approach. The latter, which involves the dovetailing of scientific knowledge with axiological and technical considerations, should lead not only to awareness of problems but also to decision-making and effective action for the environment. Moreover, its development requires a progressive evolution towards more reality-based and action-oriented pedagogical approaches.

44. Taking these methodological considerations into account, Member States have carried out a variety of experiments, but they have not always been conclusive. True, in most countries there are examples of out-of-school educational activities which are directed towards environmental action, whether they be called youth camps, 'transplanted' classes or action projects. But as a rule such activities have only a complementary if not secondary role compared with the work of transmitting abstract and segmented information about the environment.

45. There are many obstacles in the way of the large-scale adoption of active teaching methods: the lack of flexibility of programmes, due to their timetabling, the fact that the effectiveness of education is still evaluated in terms of individual performances and the shortage of funds needed if all pupils are to take part in 'field' educational activities. Many countries, however, think that one of the principal difficulties lies in the quantitative and qualitative inadequacy of the teaching materials that are required in order to deal properly with environmental problems, as to both content and teaching methods. Of course, teaching material of itself cannot make educators apply the teaching methods desired or encourage them to adopt the attitudes and acquire the new knowledge needed for the development of environmental education. But it is essential as a guide for teachers and pupils in their work, especially in a sphere as new and complex as environmental education.

46. Since the Tbilisi conference, most countries, both industrialized and developing, have made a considerable effort to develop various types of teaching materials for use in environmental education. The developing countries have paid most attention to the production of conventional printed materials (handbooks and teaching guides, books for the general public and magazines) dealing mainly with nutrition and health problems and, to a lesser extent, with questions concerning the conservation of natural resources and the various forms of pollution. They have also stressed production of audio-visual materials (films, slides, tapes) which generally deal with the same themes as conventional materials but which are rarely used together with the latter in school activities. The developing countries seem moreover to be particularly poor in teaching materials favouring active teaching approaches, such as simulation games or environmntal kits (apparatus for environmental measuring, detecting, etc.). Excessive cost is often the reason for the lack of this type of material and, even more so, the lack of more sophisticated material (for example, simulations involving the use of computer or expensive

laboratory equipment). Yet among the most modern teaching materials there are less costly and equally effective solutions such as role playing or games of the 'pencil and paper' type. The obstacle in this case seems to be the skill needed to produce them and apply them to educational ends.

47. In industrialized countries greater attention has been given to the development of conventional and audio-visual materials dealing with major problems of the environment (health and nutrition, pollution, conservation of natural resources and the problems of the urban environment, etc.). New teaching materials are also more readily available, and they are often directed towards problem solving and towards environmental action, and call for pupils' participation. The principal teaching materials are kits for the observation and analysis of pollution, educational games dealing with important environmental themes (the functioning of the ecosystems, the conservation of natural resources, town planning, etc.), as well as 'educational itineraries' for the interpretation of specific environments (national reserves and parks, the town, museums, the school, etc.).

48. Despite the efforts that have been made, there is still a considerable demand for teaching materials to provide environmental education for all in both school and out-of-school education, although the extent and the nature of the shortages vary from one region to another. Member States consider the development of teaching materials as one of the permanent priorities of their future action in the sphere of environmental education.

49. While trends in the development of environmental education are on the whole the same in the various types and at different levels of school education, there are also some variations which should be analysed so that we may gain a better understanding of the progress achieved, as well as of the needs which are still unsatisfied in this sphere.

50. At present, primary and secondary levels--the core of general education--are the spheres in which the development of environmental education has been the most intensive. At these levels, most Member States have gone beyond the stage of arousing pupils' awareness, and have prepared teaching programmes based on various themes or problems relating to the environment. Material relating to the environment is usually incorporated into the natural sciences, and also into some of the social sciences.

51. Nevertheless, certain countries stand out from the rest, particularly at primary level, in that they have produced teaching units based on an interdisciplinary approach, with a cognitive, theoretical and practical content, usually dealing with environmental concerns, such as the use of natural resources, pollution, health and nutrition. As the primary level lends itself particularly well to the forming of the child's values and attitudes, some programmes also include content and activities aimed at stimulating sensitivity to the environment, as well as the development of a social ethic in which the environment is seen in the context of national development.

52. Two countries, amongst many others, provide good examples of such activities. The first example is the programme for construction of a new type of school undertaken by the Revolutionary People's Republic of Guinea, the school being organized as an educational and productive unit which undertakes agricultural, handcraft and cultural activities. Experience has shown that this type of school constitutes an excellent means of giving the pupils the scientific knowledge, ability and attitudes required for solving practical environmental problems, which arise when economic and technological choices connected with specific production

activities (agriculture, stock-breeding, fishing, building construction, etc.) have to be made, or even when the school is taking part in practical socio-economic development action at the local level. This innovative conception of general education, which places environmental considerations within socio-economic development concerns, provides a framework favourable to the development of environmental education based on an interdisciplinary approach, in which reflection is combined with action directed towards the solving of specific problems, and which therefore favours the implementation of development strategies compatible with improvement of the quality of the environment. Moreover, in countries which have a high rate of student drop-out in the first years of institutionalized education, productive schools such as these mentioned above sometimes constitute the only opportunity to give young people a methodical training and prepare them to play an effecive role in the work-life.

53. Another original experience, although more conventional, has been carried out by Norway, which benefited from the conceptual contribution of the Tbilisi conference. Under the Norwegian project for environmental education, a programme of studies for primary-school teachers in the Scandinavian countries was prepared, with a view to improving knowledge, attitudes and practical skills in the matter of the environment. This programme also sets out detailed methodological principles to assist teachers in using copious material, which includes more than sixty modules, grouped around four main themes: knowledge of the environment, its major problems, ecosystems and, finally, population, nutrition, health, and the use of resources.

54. At the secondary level, even more than at the primary level, because of the obstacles in the way of the development of interdisciplinary educational approaches already referred to, the incorporation of environmental content is still confined in several countries to activities carried out occasionally in connection with science education. However, as in primary teaching, study programmes with an interdisciplinary outlook and dealing more fully with environmental problems, are being tested and in some cases widely disseminated in certain countries, in particular industrialized countries.

55. One of the noteworthy achievements in this respect is the Regional Environmental Learning System (RELS) which the Office for Environmental Education in the United States has introduced at national level. RELS consists of a model environmental study programme, holistic in approach and intended for pre-university classes (K-12). It is meant to act as a frame of reference for adaptation at the level of states or districts; an excellent example of it is the Californian Guide to Environmental Education, whose four volumes contain suggestions for educational activities and teaching directives for the teachers and pupils of the various primary and secondary classes. The contents are of a practical nature, which facilitates the use of the Guide; they deal with four major spheres: the natural environment, the built environment, social institutions and decision-making concerning the environment, and energy and the management of resources.

56. Another undertaking on a national scale which has a similar aim to that of RELS, although independent of the latter, is the Human Habitat project, which is carried out by the Conservation Education Association, whose head office is at the University of Wisconsin, in Green Bay, Wisconsin, United States of America. This project has developed a conceptual framework around certain basic concepts (culture, nature and the ethics of decision-making) which constitutes the foundation of a large number of handbooks and teaching materials suitable for the requirements of formal education, from the kindergarten to the end of secondary schooling. As a support to classroom activities, a television series--similar to the television programme (United States) on astronomy called Cosmos--will also be

available to schools and the general public, by means of cable television and other supportive material such as video cassettes and video records.

57. Another noteworthy national experiment in environmental education at the secondary-school level has been carried out by the Ukrainian SSR. Every year during the holidays, all pupils in the last years of secondary schooling (14-16 years) must do practical field work as a part of their regular curriculum and whose aim is to familiarize them with practical problems of the environment in real production situations. Working on farms (kolkhozes, sovkhozes, etc.), and with the help of interdisciplinary teaching teams consisting of their teachers, scientists and workers in various branches of production, the pupils carry out pilot projects to determine the best way of managing the environment in such areas as agriculture, stock-breeding, forestry, etc. The pupils plan and carry out all the activities; they can thus apply their theoretical and practical knowledge about the environment in situations that actually occur in production and also gain some experience in decision-making and collectively organizing work. Such activities help to stimulate and strengthen their civic spirit as well.

58. Since the Tbilisi conference, an increasing number of Member States in all regions have produced general educational programmes designed to familiarize university-level students with environmental problems. These programmes are aimed at students of various disciplines, particularly technicians and scientists who, without being specialists in the sphere of the environment, can have a considerable impact on the latter through their professional activities (architects, town planners, engineers, members of the medical profession, geographers, economists, planners, etc.). In some cases, the strategy adopted consists in reinforcing those parts of the traditional training which are more closely related to the environment (for example, questions of sanitation equipment in the training of civil engineers). Less frequently, new subjcts dealing with the environment have been added to the compulsory curriculum. Most often, however, this incorporation of the environmental dimension takes the form of short general courses of a theoretical nature, which have very little practical effect on professional training. Students who are interested in these questions can sometimes do further training at post-university level, but as this depends upon the individual's decision and is moreover very expensive, both for the individual and for society, it is hardly to be considered as a strategy for environmental education which is applicable to all future professionals.

59. Lastly, technical and vocational teaching is another type of school education in which the incorporation of an environmental dimension assumes special importance. The training of specialists in the sectors of industry and agriculture--middle-level technicians, skilled workers, farmers, craftsmen, supervisory personnel--is part of a process of lifelong education in which various social institutions, such as enterprises, workers' organizations, institutions concerned with the mass media, etc. fulfil essential and complementary functions. Although in most Member States the pre-service training of these socio-professional categories is provided within the school system by specialized teaching at secondary level, much less content concerning the environment is covered than in other forms of school education. This situation is all the more disturbing since the daily activities of these socio-professional categories have a considerable impact on the environment and, consequently, on the conservation of its quality and productive potential.

60. One noteworthy national experiment in incorporating an environmental dimension into technical and vocational education is that carried out by the USSR. In response to recommendations of the Tbilisi conference, the state committee for technical and vocational education has introduced theoretical and practical

training courses on the urban and natural environment in vocational and polytechnical schools of all the Soviet Republics.

61. Other significant national experiences have been carried out in particular in Czechoslovakia and the Federal Republic of Germany. In Czechoslovakia, environmental education has been systematically incorporated into the curriculum of all secondary level polytechnical schools, in order to provide pupils with the knowledge and the technical skills that will enable them to play an active role in the protection of the environment in their future work. The content of environmental education for the various trades and occupations is incorporated into the educational curriculum of the various fields of vocational activity in the form of teaching units including theoretical courses and practical activities; content is adapted to suit the environmental and technological problems specific to the various branches of production (mining, metallurgy, chemical technology, engineering, the building industry, agriculture, health, applied arts, etc.). In the Federal Republic of Germany there has been a marked trend in the last few years towards the inclusion of environmental content in the teaching of various traditional trades and technical occupations; new jobs in the field of the protection of the environment have been created (for workers trained in the purification of water, the treatment of waste, etc.). Moreover, many adult education institutions have incorporated content regarding the protection of the environment into their regular curricula.

62. But it is true that environmental programmes for technical and vocational education are still few and that their systematic development constitutes a major requirement and priority in all regions.

Out-of-school environmental education

63. Non-formal environmental education activities can be grouped together into two main categories according to the extent to which they are formalized: on the one hand the systematic, though non-formal, education provided by public or private bodies concerned with adult education or, in certain cases, the literacy training of various socio-occupational categories in the different sectors of production (industry, agriculture, trade); on the other hand, the education and information of the general public (young people and adults, producers and consumers), usually obtained through participation in community life or exposure to the mass media.

64. Member States of the various regions have begun to develop adult education activities concerning the environment for each of the above-mentioned categories, or have encouraged them where they already exist. For instance, environmental problems concerning nutrition, health and the conservation of natural resources are often treated in the functional literacy programmes undertaken in many of the countries in Africa, Asia and Latin America. In some countries, education for farmers also includes some treatment of the same problems, and multimedia teaching material has been specially developed for them.

65. The experience in Colombia of the Institution for Cultural Action (ACPO) is particularly significant in the sphere of lifelong education for the rural sectors. This institution has established an educational multimedia system for farmers which combines direct teaching at local level and the use of mass media, in particular radio and the press. A radio transmitter with national coverage, transmitting ninteen hours a day, directs the activity of local educational centres. Apart from broadcast programmes, these centres possess a great amount of printed and audio-visual teaching material (teaching modules, recordings, discs, slides, etc.) concerning the various problems of development and the environment in rural areas. In 1978, more than 18,000 local educational centres, with more than 70,000 farmers

as pupils, gave practical training in the use of natural resources (soils, water, vegetal cover), the development of the techniques needed for agricultural, pastoral and handcraft production, nutrition and health. Recently, ACPO has established an international department, in order to contribute to the development of similar experiments in other countries in the Latin American region.

66. In the industrial sector, environmental content is gradually being incorporated into the refresher courses organized by the bodies responsible for workers' lifelong education in several countries (for example: Bulgaria, Poland, Federal Republic of Germany, Czechoslovakia, USSR, etc.). These courses are mainly intended for people practising professions and engaged in technical crafts related to various branches (mining, metallurgy, chemistry, building, etc.), and whose activities have a considerable influence on the use of natural resources and on the quality of the environment. Moreover, problems of the work environment (for example, the effects of toxic matter, noise, psycho-social stress, etc., on health) have been given special attention in the adult education courses developed by workers' organizations in many industrialized nations as well as in some developing countries. In Europe and in Latin America, regional, national or sectoral trade union organizations have also from time to time organized meetings on questions of economic policy concerning the environment in general. It would appear, however, that the trade union movement is not so united regarding the importance to be attached to questions of the environment in general as it is concerning problems specific to the work environment.

67. Despite the activities concerning the environment developed in the domain of lifelong education for workers, the efforts made are of recent date and in general are intended for a particular purpose, so that in most cases they have little influence on the technological options which predominate in the various branches of production. The fact that there is, practically speaking, no concerted policy for out-of-school environmental education which would enable the aims of such education to be harmonized with the needs and priorities of development perhaps constitutes one of the major difficulties in the implementation of programmes dealing adequately with this subject. Many countries, aware of these inadequacies, are giving considerable priority to the future development of lifelong environmental education.

68. The most appreciable progress in out-of-school environmental education, particularly in industrialized countries, has been made in provision of education and information for the general public. The tens of thousands of community associations for the protection of the environment which have been set up in most Member States have performed an educational function of great importance for millions of persons, either directly through the action of their members, or indirectly by providing a demonstrated example. In some cases, their action has extended to the political sphere, and this has increased still further their educational and informational influence.

69. Mass media have supported the educational experiences involving environmental social action, and have played an important role in stimulating and extending awareness concerning the environment, by regularly disseminating information on the subject. The number of scientific journals, books for the general public and television programmes concerning the environment in general or its specific problems has increased greatly in the last few years. The most interesting point about this is that today not only isolated events are dealt with but also attention is increasingly being paid to the processes, causes and consequences of environmental problems.

70. Despite these encouraging trends, difficulties are still experienced in informing and educating the public about the environment and therefore in developing a real appreciation of the matter among the masses. One of the principal difficulties is the fact that there is still some ambiguity about the information disseminated by the mass media, which is due to the diversity of aims behind the messages concerning the environment. For example, it is not always easy for the television viewer to distinguish between information based on a scientific approach to the facts and problems of the environment and information responding to other purposes. Certainly this is not an easy problem to solve, for the function of the media is not to disseminate exclusively scientific messages. In this context, it would seem desirable to develop education concerning the media, so that the public would be better equipped to analyse and evaluate the messages to which they are exposed.

71. Another problem that arises in connection with informing and educating the public concerning the environment is that of the educational content of the messages conveyed by the media. While a degree of progress has been achieved in this field, programmes continue to over-emphasize the emotional and episodical aspects of environmental problems; and because generally they do not provide information of a practical content they have a limited influence on the everyday behaviour of the people. Better co-ordination between specialists preparing educational programmes and communication specialists would probably help to correct this situation.

72. The international festival 'Ecofilm', organized every year by the Czechoslovak Socialist Republic is a noteworthy event in this field. At this festival the best films of the year, including television films, on environmental questions are shown, and a seminar is held which brings together specialists from various spheres (film-makers, educators, scientists, those responsible for the media and various government departments). The aim is to promote consultation between film producers and those who frame policies for environmental protection and education. The seminar assesses the educational quality of the films selected and determines to what audiences they should be shown and which institutions can best distribute them; it also offers guidance as to future film production by indicating which themes should be given priority attention, and what methods could increase their impact and their educational relevance.

The training of personnel in the field of environmental education

'The training of qualified personnel is . . . a priority activity. This holds good for both pre- and in-service training, for the purpose of familiarizing teachers in formal education and organizers of non-formal activities for young people and adults . . .'

(Final report, Tbilisi conference)

73. Since 1977, Member States have done a great deal to improve the training in environmental matters of teaching personnel at all levels of school and out-of-school education; they consider that such training is a key factor in the development of environmental education at national level. New courses on the environment for school and out-of-school education cannot be introduced, nor can educational material be properly used unless teachers are given suitable training as regards both the content of environmental education and the methods that should be used for it. Moreover, teacher training plays a strategic role in that it is the best way of multiplying the impact of environmental education at national level, thereby increasing the effectiveness--and the cost-effectiveness--of the efforts made by states for the development of environmental education.

74. The development of school and out-of-school environmental education is to a large extent conditioned by the progress, or shortcomings, of teacher training at a given moment. Thus the trends noted in the previous chapter can be explained, in the main, by the strategy which Member States have adopted in the area of training.

75. As for the pre-service training of schoolteachers, environment-linked subject-matter has usually been incorporated into the natural sciences (biology, chemistry, physics). For some time now, it has been 'infused' into some social science subjects (especially geography), which does not necessarily mean that these two areas of knowledge have been more closely interrelated or that specific disciplines within them are less compartmentalized than they were. The initial environmental training provided for teachers is still, in the majority of cases, restricted to certain disciplines, and to a large extent the conception and development of interdisciplinary approaches meet with the same obstacles that are encountered in schools concerning subject-matter and teaching methods in environmental education. Moreover, this training is too often sporadic and theoretical in nature, and is restricted to certain environmental problems (in particular, the conservation of natural resources). Some European and North American countries have, however, succeeded in working out courses providing more thorough pre-service environmental training.

76. An increasing number of Member States in all regions of the world have made available in-service environmental courses for teachers, often in co-operation with Unesco, including classes, seminars or workshops, pilot projects, practical courses, etc. In-service training is the only means of giving teachers a systematic training in environmental matters while they are working; and besides, being less subject to the rigidity of single-discipline teaching and the institutional constraints which characterize initial training, they are more suitable for dealing with environmental situations from an interdisciplinary point of view. Moreover, they afford more opportunities for trying out active teaching methods in the domain of the environment. Nevertheless, in-service training poses numerous problems--problems of a temporal nature (what is the best time to organize it: in school time or during the holidays?); and problems of a financial nature--for some countries consider that it would be very costly to provide lengthy in-service training. All this explains why most courses are organized for a few days, from time to time, and for a small number of teachers. Moreover, those taking the courses do not appear to be highly motivated when it constitutes unpaid work in their eyes. Given the importance of in-service training these considerations should incite those responsible to work out and develop strategies of in-service training that are more worth while for both the individual and the community.

77. Some Member States have introduced innovations in this respect. Egypt, for example, reports the introduction of refresher courses by correspondence, including a theoretical part, a practical part and a final stage for evaluation and methodological consideration. The United States indicates that a series of training and education programmes for teachers and pupils has been developed in the context of the Human Habitat project, using the latest telematic innovations (video, cable television, 'telemonitoring', etc.). These promising examples do not, however, constitute a general rule. Member States' efforts to provide in-service teacher training are still inadequate, both qualitatively and quantitatively, to satisfy the needs for the development of environmental education on a nationwide scale.

78. In the past few years the provision of environmental training for teaching personnel has not developed uniformly throughout the school system. Primary school teachers, for instance, seem to have received a more thorough training in environmental matters than secondary-school teachers. This is probably due to the fact that the training of primary school teachers, since they have to teach a wide

range of subjects, favours the treatment of the complex subject-matter and various methodological approaches of environmental education, whereas the training of secondary-school teachers remains essentially specialized training in specific subjects. The priority given to the training of primary-school teachers is also confirmed, from the quantitative point of view, by the fact that most European and North American countries, as well as a few countries in other regions, have introduced an initial training course, both theoretical and practical in nature, for primary-school teachers.

79. Generally speaking, the personnel engaged in out-of-school educational activities (industrial and agricultural instructors, adult educators, specialists in communication, etc.), receive little training in environmental matters, and the institutions responsible for their training have no concerted policy on the matter; such personnel, of course, does not really come within the competence of ministries for education. The training of certain categories of educators, however, seems to have received special attention in some regions. For instance, in most Latin American countries the training of agricultural instructors has been developed thanks to the endeavours of the public sector, and also to the influence of the multimedia training systems set up by the national committees of the Latin American Association for School Broadcasting (ALER). Experiences of a similar nature have been made in Africa and Asia (particularly in Ivory Coast, Kenya, Senegal and India), and programmes have been designed to train educators of adults in the framework of functional literacy programmes (especially in Thailand, Nepal, Congo, Upper Volta, Mali, Tanzania, etc.).

80. Despite the progress achieved in teacher training and the undeniable importance of some experiments, there are still considerable needs in all regions, especially in regard to the training of secondary-school teachers and of those responsible for out-of-school educational and training activities.

Research, experimentation and evaluation in environmental education

'All [environmental education] activities call for . . . research and experimentation on the lines of emphasis, content, methods and instruments necessary for . . . (this) education . . . (as well as the) . . . constant evaluation of the many innovations (in this field) . . . in order to encourage and improve them and to extend them to other educational institutions and programmes.'

(Final report, Tbilisi conference)

81. In the last few years an increasing number of Member States have given special attention to research and experimentation in environmental education because of the need to ensure the coherent development of this type of education on the basis of a rational analysis of the facts, problems and national requirements.

82. Research and experimentation, often undertaken with the co-operation of Unesco, have played a considerable role: they have made educators aware of the need for environmental education, and provided an opportunity for assembling human, technical and material resources to meet the complex pedagogical and institutional demands which its provision entails; moreover, they have made it possible to carry out a number of educational innovations in the treatment of environmental education, the development of new teaching methods and the conception of more effective educational and training programmes.

83. One of the most crucial problems in the development of environmental education that has been dealt with by educational research in this field, and undoubtedly one of the most difficult to solve, is that of the preparation of cognitive

subject-matter for this type of education. Environmental education content, as mentioned, should be holistic in nature and the outcome of the integration of knowledge about the environment acquired from a number of scientific and technological disciplines (physics, chemistry, biology, ecology, social sciences, etc.). But, as in current scientific practice, research and knowledge are divided into a number of different subjects, which often have widely differing aims and methodologies; to attempt to integrate the knowledge and the approaches of environment-linked disciplines would only be possible at the stage of the transmission of knowledge, and even that is an ambitious aim.

84. This problem led to that of identifying criteria or integrating principles which would make it possible to articulate, for educational purposes, the information contributed by the disciplines in question coherently and organically. Research carried out to this end has resulted in the identification of integrating principles at the conceptual level, such as the concept of energy, or at the methodological level, such as the systematic approach, or at the thematic level, such as ecology and ecodevelopment.

85. The first of these seemed very tempting, because a single major concept could act as a connecting link in the explanation of various environmental phenomena, and could therefore serve as a bond holding various disciplines together. Its original aim, however, has been gradually restricted because, as the conceptualization of the environment evolved and as the human phenomenon--at first considered an exogenous factor--was integrated into the very notion of the environment, the concepts decided upon--such as that of energy--became inadequate to reflect all the dimensions of the human environment, particularly its socio-cultural aspects. An interesting application of the concept of energy as related to the environment at pre-university level is currently being developed by the University of Paris VII, with the co-operation of IEEP.

86. As for the second integrating principle, the systematic approach has been the subject of special attention. A product of systems analysis, the systematic approach is a methodological tool whose aim is to identify within a coherent framework (system) all the factors, states and interactions which characterize the occurrence of any environmental phenomenon or problem. The relative simplicity of certain applications of this approach has made it possible to construct, with a varying degree of precision, systematic frameworks concerning various environmental matters (systems for the exploitation of natural resources, systems for the functioning of towns, systems for fighting pollution, etc.), which have further made it possible to work out educational content so as to include the contribution made by various disciplines in both the natural and the social sciences. One of the recent applications of this approach, which is a good demonstration of its flexibility, has been made by the project on 'Macrosystems of the Venezuelian Environment', undertaken by the Ministry for the Environment in that country, in co-operation with UNEP, Unesco and UNDP. The systematic approach is used here to define a coherent framework of environmental phenomena and problems for research purposes, the training of technicians and management of the environment.

87. Finally, in recent years special attention has been paid to the theme of ecodevelopment with a view to defining the content of environmental action and training. This thematic approach, which is both heuristic and operational, takes a broad view of development, which includes the geographical, historical, ecological, socio-economic and cultural conditions of the people and seeks to evoke in them the desire to participate actively and responsibly in the improvement of the conditions of their lives.

88. At present, this approach is used in a considerable number of developing countries in various regions to orientate scientific research, the training of personnel and the execution of development projects at the local level. The experiments in environmental training carried out by ENDA (Dakar) in several African countries are of special interest, because they are the forerunners of the use of the ecodevelopment approach for educational ends. There seems to be no theoretical obstacle to the extension of its field of application to all environmental education activities. In fact, the ecodevelopment approach plays a complementary role to that of the systematic approach, in that it delimits one aspect of reality in function of which the materials contributed by various disciplines can be articulated in order to achieve an educational approach to the environment which relates the process of teaching and learning more directly to significant and effective action on the environment. The experiments carried out by several countries in linking education with productive work could provide a conceptual and institutional framework that is extremely favourable to the development of teaching experiments concerning the application of the ecodevelopment approach to environmental education.

89. Environmental education is not a teaching approach which is restricted to the transmission of knowledge; it also covers affective matters and behaviour. The aim of environmental education is to encourage people to adopt values and attitudes favourable to the conservation and improvement of the environment, and to direct their intellectual and practical efforts towards the search for solutions to environmental problems, towards decision-making and action. Numerous pedagogical research activities have been undertaken over the past decade in order to identify methods by which values, attitudes, beliefs, etc. can be treated in the teaching and learning process. Strategies such as 'values clarification' (Merril Harmin), 'values inculcation' (Douglas Superka), 'moral development' (Laurence Kohlberg) or 'values analysis' (Jerrold R. Coombs), have been tested on a large scale within the framework of predominantly the social sciences (civics, social studies, geography, etc.). Various approaches and techniques have also been conceived and developed so that questions relating to decision-making and to the planning of action in relevant teaching situations can be dealt with; problem-solving methods, action research, simulation and games, etc. are noteworthy in this connection.

90. Although the importance of these methodological innovations for environmntal teaching is undeniable, they have not yet been widely applied to environmental matters. On the one hand, approaching affective questions explicitly during educational processes in some communities comes up against resistance from teachers, pupils or parents; on the other hand, most of the experiments and practical applications in this field have been carried out in industrialized countries, which makes their transfer to other cultural and environmental situations difficult. The fact is that if pedagogical tools are to be developed which can be used in discussing values, in practical and varied teaching and learning situations, they must be tried out and adapted to the special conditions of societies.

91. Experiments for this purpose have been carried out in some countries so as to adapt the content of environmental education to their environmental, socio-economic and cultural circumstances. They are usually designed to identify local environmental problems which should be given priority attention in education, or else to develop educational content and teaching materials better suited to the mentality and requirements of the different groups for whom the educational process is intended. Pilot projects in environmental education for various sectors of the population--pupils, students, agricultural workers, the general public, etc.--have been implemented for this purpose, with the co-operation of Unesco, in many countries of different regions.

92. Lastly, a most important aspect of research and experimentation on environmental education which has been little developed to date is the evaluation of teaching and learning achievements. As was made clear at the Tbilisi conference, evaluation should provide useful information about changes that should be made in the conceptions underlying the preparation of educational and training programmes, and about how teaching materials can be improved. The evaluation of environmental education requires more than the approaches, methods and techniques that are commonly used in the evaluation of general education. In addition to cognitive achievements, the evaluation of environmental education must cover competence in decision-making, problem-solving and the organization of action, as well as the values which determine the orientation of individuals and the community towards the environment.

93. Some attempts have been made to produce better evaluation tools that can be used to assess complex educational processes such as those which have been referred to--for instance, the experimental battery designed for evaluating environmental education activities concerning problems of the urban environment which have been prepared, with the co-operation of Unesco, by the Institute for Urban Studies and Community Service at the University of Charlotte, North Carolina, United States, and those produced by the Teaching Methods Unit in the University of Paris VII, for evaluating educational activities concerning the conservation and use of natural resources. It must be admitted, however, that apart from the technical difficulties indicated the problem of evaluating environmental education is equally due to prevalent institutional and educational attitudes. It would seem that, as long as educational systems continue to place the emphasis on cognitive and individual achievements, the approach suited to environmental education will not be effectively realized.

94. Therefore, although there are some encouraging trends, many countries do not systematically carry out research and experimentation when they are planning and implementing environmental education programmes. This is due firstly to the difficulty of choosing between the experimentation of teaching innovations on a small scale and the extension of existing approaches and solutions on a large scale, a difficulty experienced particularly by states that have an overloaded educational budget and are obliged to satisfy the people's most urgent needs. Secondly, most countries have insufficient personnel qualified in scientific and administrative matters to carry out rigorously controlled research and experimentation which would be of real use in orientating educational policies and strategies. Finally, the fact that research units are attached to a particular sectoral administration (education, agriculture, environment, etc.), or university department is a hindrance to the dissemination and effective use of scientific information, as well as to the interdisciplinary work which is the very basis of innovation in environmental education.

95. The development of research and experimentation activities in this field thus seems to be slowed down by problems of an institutional nature similar to those which, a few years ago, held up the implementation of national policies and programmes concerning environmntal education in most of the Member States: the shortage of qualified administrative and technical personnel, the lack of co-ordination between public and private actions, the duplication of efforts and, as a consequence, the inefficient use of financial, human and technical resources which are, in any case, limited. The national mechanisms for consultation and co-ordination which have already been set up in many countries could do much to overcome these difficulties.

CHAPTER III: NEEDS AND PRIORITIES FOR THE FUTURE DEVELOPMENT OF FORMAL AND NON-FORMAL ENVIRONMENTAL EDUCATION

Needs and priorities concerning policies, planning and mechanisms for the development of environmental education

96. Much legislation concerning environmental education has been adopted over the past few years by Member States, but by no means by all of them. Moreover, contemporary experiences indicate critical shortcomings in this domain.

97. For example, environmental concerns are rarely given specific consideration in national educational plans, which does not facilitate the proper assessment of requirements in this area and, consequently, of the financial, human and material resouces needed for them to be met. Policies implemented under these conditions are often the outcome of independent sectoral decisions which frequently give rise to duplication of efforts and to less effective use of available resources.

98. Unless the intersectoral co-ordinating bodies set up in several countries to help meet the shortcomings mentioned are the result of a will for national planning and are given sufficient budgetary resources and authority, they do not appear to have much influence on either the formulation or the implementation of policies in environmental education.

99. Most national experience has shown that the relative insufficiency of co-ordinating bodies, as regards their institutional coverage or their functional efficiency, has made it difficult to adopt a concerted policy for the various modalities of both school and out-of-school education. The fact that nationwide action concerning environmental education was taken at the outset within the formal school system seems to have helped to accelerate the development of environmental education at the various school levels. Such action, apparently for reasons of priority, has had less impact in medium-level technical and vocational education.

100. In the area of out-of-school education, action concerning environmental education is rarely the subject of a general policy; the co-ordination of programmes between the various forms of education and mass media institutions seems to have been successful in only a few national experiences.

Needs and priorities concerning content, methods and materials for environmental education

101. In recent years Member States in all regions have devoted great efforts to the integration of environmental education into school and out-of-school education processes. Needs and shortcomings, both qualitative and quantitative, nevertheless persist in all domains of education.

102. As to the treatment to be given to the content of environmental education, the predominant strategy is to incorporate specific subjects relating to various environmental problems, in particular that of the conservation of natural resources, into the curricula of the natural sciences. In the social sciences, the introduction of an environmental dimension still proceeds hesitantly; in literary subjects and mathematics practically nothing has yet been done.

103. The preparation of a holistic content has proved arduous because an interdisciplinary approach is still rarely made to the study of environmental problems, particularly at the various levels of secondary education. The main obstacles to the development of such an approach seem to be, on the one hand, that teachers and curriculum developers are insufficiently informed of the results of

pedagogical research in this field and, on the other hand, that there are not enough practical models with which the organizational and teaching constraints inhibiting interdisciplinary dialogue and work within formal education systems could be even partly overcome.

104. As to the objectives of environmental education, the practice of such education remains generally focused on the transmission of content of a cognitive nature, using pedagogical and methodological approaches which emphasize theoretical aspects and still tend to favour instruction centred on the teacher. The curricula make only occasional references to the affective and technical aspects which environmental education involves. The explanation lies not only in the importance given to the cognitive aspects but also in the insufficiency of practical teaching procedures that could be used to form values, to develop instrumental skills and to evaluate the results achieved in these respects.

105. All Member States report as one of the main obstacles to the development of an innovative environmental education practice, in keeping with the objectives and principles defined by the Tbilisi conference, the lack of low-cost teaching materials with which environmental problems could be studied in an interdisciplinary perspective and teaching and learning procedures centred on the pupil could be encouraged. The difficulties associated with the development of this type of material (games, simulations, action projects, etc.) seem to stem less from technical or financial problems than from the inadequate training of teachers in making such materials or using them in teaching practice.

106. As far as the various levels of formal education are concerned, the keenest needs with regard to environmental education are felt in technical and vocational education. Shortcomings can be observed in all aspects of the education process, in particular in pedagogical research, teacher training and the preparation of teaching materials. Member States in all regions consider that the future development of environmental education in technical and vocational education should be given equal attention with general education, particularly at secondary and higher level.

107. In the sphere of non-formal education, the most urgent need is for the development of environmental education programmes designed for the general public and for social and occupational categories such as farmers for example. A better use of the existing mass media networks (radio, television, etc.) and the harnessing of the new communication technologies (conversational television, video cassettes and video discs) for the purposes of education and public information concerning the environment should prove major assets in the future activities of Member States in this field.

Needs and priorities concerning the training of personnel for environmental education

108. In recent years considerable efforts have been made by Member States in all regions with a view to developing the pre-service and in-service training for school and out-of-school teachers and eductors in the sphere of environmental education. Member States are, however, in agreement in recognizing that vast needs remain to be met, from both the quantitative and the qualitative standpoint, before environmental education can become the general practice at national level.

109. In the formal school system, initial environmental training is not yet a systematic practice in many countries, especially developing countries, and usually consists merely in making teachers aware of the general problems of the

environment; the influence of this process on teaching practice is necessarily limited.

110. Where a more thorough training is given, it is usually confined to training by discipline, in which environmental problems are divided up according to the theoretical subject of the discipline in question. In all regions, it is still uncommon to find a pre-service teacher training which aims at an interdisciplinary approach to environmental teaching.

111. Training by discipline distinctly favours the acquisition of theoretical scientific knowledge concerning the environment, at the expense of consideration of the affective, technical and methodological aspects proper to the pedagogy of environmental education.

112. So far as in-service teacher training is concerned, existing institutional strategies come up against a series of financial and organizational constraints which detract from their effectiveness in the quantitative sense, and hence from their influence on teacher training in general. It would seem that the search for in-service strategies whereby in-service training for teachers may be generalized at less cost will have to be given priority in years to come.

113. The environmental training of teachers at the various levels of general school education and technical and vocational education represents an important priority for the future action of Member States to make environmental education a general practice at national level; more should be done to develop appropriate curricula and teaching materials for this purpose.

114. The most pressing needs in the sphere of teacher training are for personnel in out-of-school educational activities, and in particular instructors for adult education, rural education and literacy programmes, especially in developing countries. The great majority of countries regard the satisfaction of these needs as one of the main priorities for future activity in environmental education. In this connection, special attention should be given to environmental training for those in charge of the preparation of programmes for the mass media.

Needs and priorities concerning research, experimentation and evaluation in environmental education

115. Through research and experimentation in environmental education, striking progress has been achieved in recent years in the preparation of content and in the development of suitable teaching and learning approaches in this field of education. The development of environmental education is far from completed, however, and satisfactory solutions remain to be found for many conceptual and practical problems. In this connection a majority of Member States agree in recognizing the need to pursue sustained efforts in the sphere of pedagogical research and experimentation.

116. The lack of a coherent research policy laying down priority lines of national action in this sphere and favouring a better co-ordination of the activity of various public and private institutions of pedagogical research is one of the most serious constraints to the development of research and experimentation in environmental education and hence to the efficient development of such education. The application of such a policy should be of assistance in rationalizing the use of the human, financial and material resources available at the national level.

117. The fundamental contribution of pedagogical research to the progress of environmental education has been to devise conceptual and methodological approaches

whereby a holistic content could be elaborated for environmental education and an educational practice with an interdisciplinary outlook could be developed. These approaches, however, remain too theoretical, and a priority future task for research and experimentation in this sphere would be to develop them in more practical forms applicable to the preparation of school curriculum and training programmes and to the preparation of teaching materials relating to various environmental situations.

118. Despite the progress achieved through research and experimentation on pedagogical methodology, and in particular in developing teaching and learning procedures relating to the affective and technical aspects of environmental education, considerable needs still remain to be met. Apart from the urgent need for a wider and more systematic dissemination of the results of research and experimentation in this sphere, it is clear that future experimental activities should be directed with priority towards the development of methods of active teaching and learning that will allow the pupils to express their creativity and sensitivity with regard to the environment; and towards the preparation of teaching materials that afford a practical means of bringing active teaching methods into association with a holistic environmental content.

119. Perhaps the most pressing need with regard to pedagogical research and experimentation concerns the design and application of effective approaches and methods that would be easy for teachers to use in evaluating the various cognitive, affecive and technical aspects of environmental education and training.

PART TWO

TYPICAL TRENDS, NEEDS AND PRIORITIES IN ENVIRONMENTAL EDUCATION AT REGIONAL LEVEL

CHAPTER IV: TYPICAL REGIONAL TRENDS IN ENVIRONMENTAL EDUCATION

120. This chapter describes certain characteristic trends in the development of environmental education since the Tbilisi conference. These trends are drawn from generalizations of typical or representative situations existing in each region and are based exclusively on responses of Member States to a questionnaire which was sent to them in 1981-1982. They do not constitute specific national profiles and do not reflect national situations or ventures which, while less frequent and atypical, sometimes assume considerable importance.

121. Aspects of regional trends in environmental education, described below, concern in particular: the development of environmental awareness, the formulation of national environmental education policies, and certain essential elements of the environmental education process (development of curricula, preparation of education material and training of teachers).

AFRICA

122. So far as the African region is concerned, the sectors of the population engaged in intellectual pursuits--particularly scientists and professors, and to a lesser extent civil servants and university students--have become far more aware of the environment than sectors engaged in agricultural and industrial production (farmers and workers, manufacturers). Such awareness is also more noticeable in urban than in rural areas.

123. The development of environmental awareness in countries of the African region seems to have been largely influenced by the activities of authorities (governments or local groups), initiatives taken by international organizations (Unesco, UNEP, FAO, etc.) and, to a lesser extent, by press, radio and television through their information programmes.

124. Eleven countries in the region also reported that there was legislation regarding environmental education. This generally takes the form of ministerial recommendations emanating from several ministries concerned with environmental education (education, environment, agriculture and health) and ensuring that environmental education is pursued on a national scale.

125. Environmental education has mainly been developed in the context of the school system. There has been a general tendency to introduce educational content related to various aspects or problems of the environment (nutrition, health, pollution and the conservation of natural resources) into the existing curricula of primary schools and universities and, to a lesser extent, into those of secondary schools. In the field of out-of-school environmental education, activities have generally been limited to making the public aware of the most urgent environmental problems. However, in some countries, there are educational programmes for adults, particularly in rural areas, dealing with nutrition and health, food production and the conservation of natural resources.

126. The various forms of teaching material for environmental education are still inadequately developed in the African region. The best prepared material is that

for use in schools (textbooks, guides, etc.). They deal chiefly with problems connected with health, nutrition and the conservation of natural resources. Teaching materials calling for action-oriented teaching practices (educational games, simulations, environmental kits) are generally not very well developed either in quality or quantity.

127. The dominant strategy governing the training of teachers for environmental education has been to include educational contents related to the environment in pre-service training in the natural and social sciences. Refresher courses are less frequent, and are usually limited to occasional lectures on problems connected with health and the conservation of natural resources.

LATIN AMERICA AND THE CARIBBEAN

128. In the Latin American and Caribbean region, the development of awareness of the environment and its problems attains its highest level in scientific circles. This awareness is also well developed among university students, teachers and civil servants; it is less so in the productive sectors. Moreover, there seems to be a more acute perception of environmental problems and their implications in the towns than in the suburbs and rural areas.

129. For most countries of the region which replied to the questionnaire, it appears that the mass media and the voluntary associations (conservationists, consumers, etc.) have had a preponderant influence on the development of environmental awareness. Activities undertaken by scientists and teachers are also worth mentioning, as are those of international organizations (Unesco, UNEP, FAO, etc.), even though their influence in this connection has been less.

130. Some ten states of the region have inaugurated national policies or programmes of environmental education. Such policies are usually based on various types of legislation, generally taking the form of ministerial directives from all ministries concerned with the environment, and also, in certain cases, private organizations which are active in the field. These policies, which are usually of a compulsory nature, generally confer priority on general education, particularly at primary and secondary level, and on the training of teachers. They assign an environmental core for all educational programmes, to which regional variations are sometimes added.

131. In accordance with the priorities laid down by environmental education policies, curricula have been chiefly developed for the school system. At primary level, contents dealing with the environment often assume the form of study units devoted to the problems of conserving natural resources, preferably incorporated into the area of the natural sciences. At secondary and advanced level, the monodisciplinary approach to environmental problems is preponderant, and emphasis is usually placed on subjects related to the conservation of natural resources, health, nutrition and pollution. So far as out-of-school education is concerned, environmental problems are chiefly dealt with as part of adult education. Environmental education in connection with literacy teaching and rural education has been undertaken on a more limited scale.

132. In the majority of countries, teaching materials for schools are best developed (textbooks for pupils, guides for teachers, etc.). They usually reflect the predominance of traditional teaching methods, based on the transmission of knowledge to pupils from the teacher. Teaching aids (educational games and environmental kits) favouring action-oriented teaching and encouraging pupil participation are still insufficiently developed. However, in the African region

large-scale production of good quality informative material dealing with the environment (popular-style books, magazines and newspapers, and to a lesser extent audio-visual material) should be noted. This may partly explain the influence of the mass media on the development of regional awareness regarding the environment. As in the case of other developing regions, it is noteworthy that there is a preference for dealing with problems bound up with health and nutrition, the conservation of natural resources and the various forms of pollution in the different teaching and information materials.

133. As regards the training of teachers in environmental education, a large number of countries provide refresher courses, depending on needs and according to the nature and urgency of certain environmental problems. Moreover, pre-service training courses for schoolteachers usually incorporate subjects dealing with various environmental problems into the natural and social sciences. Numerous countries have also resorted to interdisciplinary practices for the retraining of scientists and technicians as well as rural teachers and leaders in environmental questions, in spite of the fact that the initial training of these groups is pursued in accordance with more traditional monodisciplinary methods.

ASIA AND THE PACIFIC

134. Environmental awareness has increased more among scientists and professors, and to a lesser extent among other intellectuals, particularly civil servants and university students, than among farmers and industrial workers. Initiatives taken by governments and local authorities seem to have a preponderant influence on the development of environmental awareness in the region.

135. All the eleven countries which answered the questionnaire have undertaken national activities in environmental education, with priority to the school system. In the majority of cases, these activities are based on various types of legislation (laws or decrees dealing with the environment, regulations specific to education, ministerial directives, etc.) which usually concern several ministries and constitute regulations which are binding at national level. However, it should be emphasized that, in certain countries, such regulations are optional.

136. Environmental education curricula have mainly been developed within the school system. In a considerable number of countries in the region, the most striking progress has been achieved in higher education, where new subjects dealing with pollution, the conservation of natural resources and, to a lesser extent, the organization of the urban environment, have been added to the training curricula for certain scientific and technical disciplines (particularly in the training of engineers) on the same footing as other subjects. In addition, certain countries have started new vocational training courses on the environment. As regards curricula for primary and secondary schools, certain contents dealing with the environment have usually been incorporated into natural and social science subjects. It should also be noted that some countries have attempted to use more coherent study units, particularly at secondary level, dealing with health and nutrition problems. Out-of-school environmental education has generally been less developed in this region. Some countries, however, have paid more or less systematic attention to problems connected with health, nutrition and the conservation of natural resources as part of their adult education and literacy teaching programmes.

137. In most countries which replied to the questionnaire, an inadequate development of teaching materials is noted. The means which are perhaps most developed where the environment is concerned are magazines, newspapers and

audio-visual materials (films, transparencies, etc.) designed to inform the public through the mass media (press, radio and television). As with other developing regions, teaching material for use in schools generally uses conventional teaching methods. The chief subject dealt with by such material are health and nutrition and, to a lesser degree, pollution and the urban environment. However, there is a distinct shortage of teaching aids which favour action-oriented environmental education pedagogy.

138. So far as the pre-service and in-service training of teachers in the school system is concerned, most countries report that general environmental courses have been started and, to a lesser extent, that educational programmes and practices related to environmental problems have been improved and added to the curricula of natural and/or social science subjects.

ARAB STATES

139. In general, the population of towns and urban localities has become more aware of environmental problems than that of rural areas; this applies particularly to scientists and civil servants and, to a lesser extent, to those engaged in the productive sectors (agriculture and industry).

140. The mass media (press, radio and television) and the activities of scientists and the government are some of the factors which seem to have contributed most to the development of this awareness at regional level.

141. In several countries of the region, there are environmental education activities, some of which are governed by compulsory legislation on education. Such legislation mainly applies to the school system, particularly at university and primary level, and to the training of teachers.

142. In the majority of the Arab states which replied to the questionnaire, the development of environmental education has taken place within the school system. The strategy followed has usually consisted of incorporating environmental education contents into natural science subjects (biology, ecology, chemistry) and occasionally into social science subjects (geography, etc.). Several of these countries have concentrated their efforts on an educational approach to nutrition and health problems and to the conservation of natural resources. Out-of-school environmental education activities which have been undertaken in a number of countries consist essentially of adult education, generally aimed at making people aware of various environmental problems, particularly those related to health and nutrition.

143. Teaching materials for schools (textbooks, teachers' guides, reference books, popular treatises, magazines and newspapers) are fairly well distributed among the schools of countries in the region, but have not yet been sufficiently developed. The subjects dealt with by this material are mainly health and nutrition and, to a lesser extent, the conservation of natural resources and various aspects of pollution. In general, this educational material conforms to the requirements of a pedagogical strategy based on the transmission of knowledge by the teacher to the taught. There has been insufficient development of teaching material promoting the active participation of pupils in the teaching/learning process, although in some countries a certain amount of effort has been devoted to this type of material, particularly in relation to pollution, health and nutrition problems.

144. Pre-service and inservice training of teachers in environmental education remains insufficient. In some countries, however, there are pre-service curricula which include study units dealing with the environment, particularly in the training of secondary school natural science teachers. In-service training mainly takes the form of short general courses dealing with certain urgent environmental problems.

EUROPE AND NORTH AMERICA

145. In the vast majority of the countries of the Europe and North American region, there has been a very extensive awareness of environmental problems among academics (scientists, professors and students). While it is also very widespread among civil servants and students in general education, it is less so among industrial executives and workers and among farmers. Activities of the mass media, particularly in urban areas, and of voluntary associations for the protection of nature, consumer associations, etc., which rely on the active participation of scientists (ecologists, biologists, economists, etc.), have had a far-reaching effect on regional awareness of the environment. Both governments and local groups have also played an important role in this respect.

146. In the majority of the contries of the region, there are national environmental education policies and programmes based on a wide variety of legislation covering education and the environment. Environmental education programmes are usually undertaken by a group of ministries concerned with environmental problems (education, environment, agriculture, health, labour, etc.), although they are frequently undertaken independently.

147. Within the context of these policies, the priority attributed to the general school system, particularly at primary and secondary level, and to the training of teachers, should be noted. The strategy for incorporating environmental education into educational practice often provides for the inclusion of study units (prepared jointly by a number of disciplines and dealing with different environmental subjects) in the curricula of advanced and primary education and the training of teachers. In this last field, however, the majority of countries adopt a more traditional approach consisting of infusing environmental education contents into the curricula of the natural and social sciences. This approach has also been used at secondary level in dealing with problems connected with the conservation of natural resources and with pollution and, to a lesser extent, with urban environment and natural disasters. Efforts in the field of out-of-school education have been less than those undertaken in the school system. They have been mainly of a limited nature and undertaken by public or private agencies in the context of adult education. Some countries, however, have worked out more systematic programmes based on various environmental themes, particularly those dealing with health and the conservation of natural resources. It should also be noted that in this region there has been a considerable development of programmes for informing the public on environmental problems, which are very widely disseminated by means of the mass media.

148. In the majority of the countries of the region, the media providing information on the environment to the public at large (magazines, newspapers, popular treatises, films, etc.) are usually well developed. Similarly, teaching materials for schools (textbooks, guides, films, transparencies, posters, etc.) appear to satisfy, more or less, needs expressed in this field. Some countries at present appear to be placing emphasis on the production of a new type of teaching aids (games, simulators, environmental kits, etc.), which favour action-oriented teaching and pupil participation. In these various kinds of material, relatively

little attention has been paid to themes dealing with urban development and natural disasters, as compared with conventional environmental themes (conservation of resources, health, pollution).

149. In this region, the training of personnel in environmental education also constitutes a sphere where the school system has been favoured. The pre-service training of teachers for primary and secondary schools, and that of university-trained technicians, has taken place in accordance with various procedures, very often in combination with one another and including interdisciplinary practices regarding specific environmental problems, the organization of general courses on the environment for trainee teachers, and the infusion of contents related to various environmental problems into the various natural and/or social sciences. This last monodisciplinary approach constitutes the most generally used method in the in-service training of general schoolteachers. The training of people responsible for out-of-school environmental education activities (instructors in the industrial or agricultural sphere, journalists, etc.), usually consists of activities of a local or limited nature, devised according to the most urgent needs and problems.

150. Lastly, a considerable effort has been made in the region regarding research and experimentation in environmental education, notably concerning methodological approaches facilitating the development of holistic contents and pedagogical measures aimed at the solution of problems.

CHAPTER V: NEEDS AND PRIORITIES OF MEMBER STATES IN THE FIELD OF ENVIRONMENTAL EDUCATION: SALIENT FEATURES AT REGIONAL LEVEL(1)

151. In the present document, the term 'need' refers to a shortage or insufficiency perceived by a Member State in its school and out-of-school educational systems, as regards the various elements contributing to the educational process necessary for developing environmental education (curricula, teaching aids, teachers, educational research and experimentation and legislation). The term 'priority' reflects the importance or urgency attributed by a Member State to activities undertaken in order to satisfy the needs expressed. It does not, however, take into account, except perhaps implicitly, the practicality or scheduling of priority activities.

152. Needs and priorities in the field of environmental education have been assessed on the basis of estimates made by the teams which replied to the questionnaire. These estimates have been expressed in figures on a continuous scale from 1 to 5, in which 1 represents a very low and 5 a very high level of need or priority (see Annex 1 for an example taken from the questionnaire).

153. Needs and priorities at the regional level have been characterized by a central tendency statistical parameter, in this case the 'median', which is that value in the 1 to 5 scale, above or below which 50 per cent of the cases are distributed. This central tendency parameter seemed to be most appropriate, since, on the one hand, the scale from 1 to 5 expresses an ordinal level of measurement and, on the other, the distribution of cases has a moderately assymetrical (positive) form.

(1) See Annex II for some quantitative details.

154. Moreover, the values obtained and the differences observed between them should be considered as indications of an order of magnitude rather than as very precise estimations of the level of needs and priorities.

155. As regards the general level of needs in the field of environmental education for each of the regions of the world, there is above all a very high level (4.5) in Africa and Latin America, but the need is also considerable in other regions: Arab states (3.7), Asia (3.3) and Europe and North America (3.5).

156. In Africa, the most pressing needs in the field of environmental education are related to the training of teachers for schools (4.7) and technical and vocational training (4.6), to adult education (4.6), to rural education (4.6) and to literacy teaching (4.6). As for elements of the educational process, the greatest shortcomings are related to teaching aids (4.8), educational research and experimentation (4.7) and to staff qualified in the subject of environmental education (4.6).

157. Member States of the African region attribute a very high rate of priority to the development of teacher training and of adult education in the field of environmental education. Environmental concerns which should be given priority in education are related to nutrition and health and the conservation of natural resources.

158. In Latin America and the Caribbean, the most marked shortcomings in the field of environmental education are to be found, so far as the school system is concerned, in secondary education (4.6), technical and vocational training (4.7) and the training of teachers (4.7); so far as out-of-school education is concerned, in adult education (4.6). The most important needs in the educational process involve the following elements: appropriate teaching materials (4.9), pedagogical research and experimentation (4.8) and qualified teachers in the field of environmental education (4.8).

159. The training of teachers in the field of environmental education constitutes a very high level priority for future regional activities, as does the reinforcement of such education at primary level. All other levels and modalities of school and out-of-school education (with perhaps slightly less accent on university level) should also be subject to more intensive development of environmental education, particularly with a view to engaging problems related to the conservation of natural resources, nutrition and health and also, though to a lesser extent, the urban environment.

160. In Asia, the relatively most pressing needs in environmental education are felt in secondary education (3.7) and the training of teachers (3.7). The most marked shortcomings in this respect are related to appropriate teaching materials (3.5), curricula in the field of environmental education (3.4) and the number of teachers qualified to deal with curricula in this field (3.5).

161. The Asian region attributes a very high level of priority to the training of teachers in the field of environmental education, though without neglecting the various levels of academic teaching, particularly secondary and university, and technical and vocational training. The environmental problems which should be given educational priority are the various forms of pollution, the conservation of natural resources, health, nutrition and, to a lesser degree, urban environmental problems.

162. In the Arab states, there is a considerable need for environmental education at all levels of the general school system--primary (3.8), secondary (3.9),

university (3.9)--and for the training of teachers (3.9). Member States make a particular point of shortcomings in the areas of pedagogical research and experimentation (4.1), teaching materials (3.7).

163. The priorities for future action at regional level reveal a determination to satisfy the needs mentioned above; greatest emphasis is laid on the training of teaching personnel and on university teaching in the field of environmental education. Regarding the environmental problems to be tackled as a priority by such education, the Arab states agree with other developing regions in recognizing the importance of problems related to nutrition and health, and to conservation of natural resources.

164. In Europe and North America, the greatest needs in relation to environmental education are felt in technical and vocational training (4.0) and in the training of teachers (3.7). In the context of out-of-school education, the most pressing need is felt in adult education (3.6). In these spheres, shortcomings are chiefly related to qualified teachers in the field of environmental education (3.9) and to pedagogical research and experimentation on the subject (3.7).

165. Future activities of the region are determined by the priority given to the development of environmental education at all levels and by all means, with special emphasis on the training of teachers, while comparatively less importance is attributed to primary education. The environmental problems which call for priority treatment by both school and out-of-school environmental education are those related to the conservation of natural resources, the various forms of pollution and nuisance and, to a lesser extent, the urban environment.

166. Conclusion

(a) Preliminary analysis of information presented in this overview indicates that considerable progress has been made in all regions in the development of environmental education since the Tbilisi conference. The regions have particularly concentrated efforts on the development of education programmes and materials and also on the training of teachers for the various levels of the school system. It should be noted as well that some regions have attributed importance to the development of pedagogical research in environmental education.

(b) As for strategies for the incorporation of an environmental dimension into education and training programmes, the most used has been that of infusing into ongoing study programmes content related to various aspects and problems of the environment, especially conservation of resources, health and nutrition, and the various forms of pollution.

(c) It should also be pointed out that there has been an insufficient development of educational programmes with an interdisciplinary approach that, aiming at solution of environmental problems, permit the surmounting of the usual separation of the disciplines and favour actions for the environment.

(d) Environmental education needs remain considerable in all regions and concern above all the teaching personnel, technical and vocational education in the school system, and adult education in out-of-school education.

(e) As for elements of the educational process, the most marked insufficiencies deal with appropriate teaching materials, the training of teachers and pedagogical research and experimentation in environmental education.

(f) Priorities for future action for the development of environmental education concern, in particular, the various levels of general school education and technical and vocational instruction.

Finally, it rests with environmental education officials of each country to evaluate, in function of national objectives and particularities, this overview of trends, needs and priorities in the field and to draw from it guidelines for a more effective environmental education practice in the future.

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ANNEX 1

FUTURE NEEDS AND PRIORITIES IN ENVIRONMENTAL EDUCATION

In the two tables of this chapter you are asked to assess, in your opinion, the level of perceived needs in your country and the spheres of action to be given priority in fostering the future development of EE. The first table is devoted to elements of the educational process (programmes, teachers, materials, etc.) at various levels and in the different forms of education (primary and secondary level, adult education, etc.). The second table deals with environmental problem areas (pollution, conservation of resources, etc.) in terms of the same forms and levels shown in the first table.

1. What do you think are the future needs in EE in your country?

Please enter the appropriate number in each square of the table.
1. Very limited needs.
2. Limited needs.
3. Average needs.
4. Extensive needs.
5. Very extensive needs.
9. Don't know.

Educational progress / Educational levels/ forms	Primary level	Secondary level	University level	Teacher training	Adult education	Rural education	Literacy	Vocational training	Other (*)
Educational programmes									
Teachers									
Teaching materials									
Research on EE									
Legislation on EE									
Other (specify)									

* Specify: .....

ANNEX II

I. Levels of EE needs according to educational levels/modalities and regions (medians)

Educational levels and modalities	Regions					Global
	Africa	Arab States	Asia	Europe and N.A.	Lat. Am. and Car.	
General primary education $p < 0,05$	4.4	3.2	3.2	3.2	4.4	3.9
General secondary education $p < 0,10$	4.3	3.9	3.7	3.4	4.6	4.0
Technical and vocational education $p < 0,05$	4.6	3.6	3.3	4.0	4.7	4.2
University education $p < 0,50$	4.2	3.9	3.4	3.5	4.5	4.0
Teacher training $p < 0,05$	4.7	3.9	3.7	3.7	4.7	4.3
Adult education $p < 0,02$	4.6	3.5	3.1	3.6	4.6	4.2
Rural education $p < 0,01$	4.6	—	3.1	—	4.3	4.1
Literacy	4.6	3.4	—	—	—	4.0
Average of medians	4.5	3.7	3.3	3.5	4.5	4.1
Cases	19	9	8	20	14	70

— no significant information available.

p probability of error (calculated by means of the chi square test) concerning the significance of differences observed between the regions as to their levels of need. The chi square test was applied to the distribution of absolute frequencies.

II. Levels of EE needs
according to components of the educational process and regions
(medians)

Components of the educational process	Regions					Global
	Africa	Arab States	Asia	Europe and N.A.	Lat. Am. and Car.	
Curricula $p < 0,10$	4.4	3.5	3.4	3.3	4.5	3.9
Teaching materials $p < 0,05$	4.8	3.7	3.5	3.4	4.9	4.4
Teachers $p < 0,05$	4.6	3.4	3.5	3.9	4.8	4.2
Research and experimentation $p < 0,10$	4.7	4.1	3.2	3.7	4.8	4.4
Legislative $p < 0,05$	4.1	—	—	—	3.6	3.5
Average of medians	4.5	3.7	3.3	3.5	4.5	4.1
Cases	19	9	8	20	14	70

— no significant information available.

p probability of error (calculated by means of the chi square test) concerning the significance of differences observed between the regions as to their levels of need. The chi square test was applied to the distribution of absolute frequencies.

III. Future action priorities in view of EE development according to educational levels/modalities and regions (medians)

Educational levels and modalities	Regions					Global
	Africa	Arab States	Asia	Europe and N.A.	Lat. Am. and Car.	
General primary education	4.2	4.2	4.0	4.0	4.8	4.2
General secondary education	4.2	4.3	4.5	4.3	4.5	4.4
Technical and vocational education	4.2	4.3	4.5	4.3	4.5	4.4
University education	4.3	4.5	4.7	4.3	4.3	4.4
Teacher training	4.5	4.7	4.7	4.5	4.7	4.6
Adult education	4.5	4.0	4.3	4.2	4.5	4.3
Rural education	4.3	—	4.0	—	4.5	4.2
Literacy	4.2	3.8	—	—	—	4.1
Cases	19	9	8	20	14	70

— no significant information available.

IV. Future action priorities in view of EE development according to environmental problem areas and regions (medians)

Environmental problem areas	Regions					Global
	Africa	Arab States	Asia	Europe and N.A.	Lat. Am. and Car.	
Conservation of resources	4.8	4.5	4.8	4.7	4.8	4.7
Pollution and nuisances	4.0	4.2	4.7	4.7	4.5	4.4
Nutrition and health	4.8	4.8	4.5	4.3	4.8	4.7
Urban environment	4.0	4.3	4.5	4.5	4.5	4.4
Natural disasters	3.7	3.3	3.7	3.2	3.8	3.4
Cases	19	9	8	20	14	70